

1ST AND 2ND GROUPS																										3RD AND 4TH GROUPS																									
PROCESSES AND PROPERTIES INDEX																																																			
<p>Gray vat dyes. A. M. Lukin and P. N. Kulakov.            Russ. 61,417, July 31, 1937. Benzanthrones are treated            with a mixt. of concd. HNO<sub>3</sub> and HCl, dkd. with water,            and the dye is isolated in the usual manner</p>																																																			
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Dibenzopyrenequinone dyes. A. M. Lukin. Russ. 51,427, July 31, 1937. 1,4- and 1,8-Dibenzoylinsphthalenes are fused with  $AlCl_3$  or the double compound of  $NaCl$  and  $AlCl_3$  in the presence of pyrolusite as oxidizer. Cf. C. A. 33, 3601<sup>9</sup>.

ASH-31A METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND CODES																										3RD AND 4TH CODES																									
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<p>Gray-black sulfur vat dye. A. M. Lukin and Z. G. Lapteva. Russ. 52,372, Dec. 31, 1937. Violanthrone B is nitrated in nitrobenzene soln. and the product heated with an alk. soln. of hyposulfite, filtered and acidified or blown with air.</p>																																																			
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Vat dye. A. M. Lukin, Russ. 82,423, Jan. 31, 1938.  
9,10-Dibenzoylantraquinone is heated with  $\text{AlCl}_3$  or a double salt of  $\text{AlCl}_3$  and alkali metal chloride in the presence of pyrolusite instead of the generally used O or  $\text{O}_2$  contg. gases.

COMMON ELEMENTS																										PROCESSING AND PROPERTY INDEX																									
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<p>* Influence of pyrolysis on Scholl's reaction. A. M. Lukina. <i>Org. Chem. Ind.</i> (U. S. S. R.) 6, 370-5 (1939). — When benzanthrone (I) is heated at 120° for 1.5 hrs. with BzCl and AlCl<sub>3</sub> and the reaction mixt. is heated for a further 3 hrs. at 140° with MnO<sub>2</sub>, <i>trans</i>-dibenzopyrene-quinone (II) is obtained in 58% yield, together with its 1-chloro deriv. 3-Benzoylbenzanthrone (Friedel-Crafts, from I and BzCl) heated with AlCl<sub>3</sub>, NaCl, and MnO<sub>2</sub> (3 hrs. at 140°) gives II, in 85% yield. C<sub>18</sub>H<sub>12</sub> heated at 80-85° for 3.5 hrs. with BzCl and AlCl<sub>3</sub>, and then for 3 hrs. at 140° with MnO<sub>2</sub>, affords II in 18% yield. II is identical with Indanthrene-Golden-Yellow GK. It has no carcinogenic properties. B. C. P. A.</p>																																																			
<p>45B-11A METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
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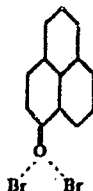


COMMON ELEMENTS										COMMON VARIANTS									
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<p>Vat dyes of the 6,6'-dibenzopyrenequinone series. A.  M. Lohm. Russ. 50,930, April 30, 1940. 4-Aroylben-  santhrone is heated with <math>AlCl_3</math> or its mixt. with <math>NaCl</math> or  <math>KCl</math> in the presence of <math>MnO_2</math> as oxidizer.</p>																			
ASB-SEA METALLURGICAL LITERATURE CLASSIFICATION										6-LETTER INDEX									
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 Action of bromine on benzonaphthalene. A. M. Lukin. *Compt. rend. acad. sci. U. R. S. S.* 28, 60-6 (1940) (in German).—To 3 g. benzonaphthalene (I) in 45 cc.  $C_6H_6$  was added with stirring 3 g. Br in 15 cc.  $C_6H_6$ . The yellowish needle-like ppt. (II) was filtered, washed with cold  $C_6H_6$ , and dried with a stream of dry air. It was impossible to recrystallize the product.  $H_2O$  and alc. cause decomp. of II;  $Na_2S_2O_4$  soln. as well as  $NH_3$  in alc.

and  $H_2O$  causes II to revert to I. II probably has the structure:



the intense color and the ease with which the Br is removed corroborate this view. II was also obtained from HOAc soln. The mother liquor from the pptn. of II on further standing (8-10 hrs.) gives another product (III). Recrystd. twice from  $C_6H_6$ , III is obtained as colorless crystals, 2,3-dibromodihydrobenzonaphthalene. III was prepd. directly in boiling  $C_6H_6$ : to 1 g. I in 15 cc. boiling  $C_6H_6$  was added 1 g. Br in 5 cc.  $C_6H_6$ , the soln. being boiled 30 min. Cooled and filtered, the soln. is evapd. to dryness and the product washed with alc. and recrystd. from alc. and  $C_6H_6$ . III (0.5 g.) was dissolved in 2.5 ml.  $PhCl$  and quickly brought to boiling. The boiling was continued exactly 2.5 min. and the liquid cooled quickly. The brownish red needles of 2-bromobenzonaphthalene-II Br were washed successively with cold  $PhCl$  and  $C_6H_6$ , and dried as usual. 2-Bromobenzonaphthalene, b.  $180.3-0.7^\circ$  (from alc. or HOAc), can be obtained by heating III for some time in HOAc or  $PhCl$  at  $100^\circ$  or above. J. C. Lo Cigno

Polycyclic compounds. II. Benzonaphthone and some of its derivatives. Influence of the benzene nucleus in the polycycloketone series. A. M. Lukin. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1941, 411-21 (in English, 421); cf. C. A. 34, 37491. In view of the fact that benzonaphthone (I) and benzanthrone (II) are frequently considered as closely related compounds, the authors selected them for their continued study of the influence of the benzene nucleus on the properties of polycycloketones. I is prepd. as follows: 12.5 g.  $O_2NC_6H_4SO_3H$  and 60 g. glycerol (98.5%), dissolved by heating to 128° in 460 g. 68%  $H_2SO_4$ , is treated over 1 hr. with a mixt. of 50 g.  $2-C_6H_4OH$  and 40 g.  $O_2NC_6H_4SO_3H$ , keeping the reaction temp. between 128 and 35°; the mass is then kept there for 1 hr., treated over a 15-min. period with 10 g.  $O_2NC_6H_4SO_3H$ , kept for 0.5 hr. at 128-35°, then 0.5 hr. at 135-7°, at which time a test portion shows absence of unreacted theory for I.HCl. I hydrobromide was prepd. by passing naphthol. The mass is cooled and filtered. The filtrate dry HBr into a benzene soln. of I, yellow needles, m. 159.8-30-5°, filtered, washed with cold  $H_2O$  and dried. The 50 cc.  $H_2O$  treated at the boiling point with 320 cc. 18.5% crude I so obtained weighs 34 g., m. 149-51°. Crystd. soln. of  $NaHSO_4$ , yields on cooling, filtration and concn. from dil. EtOH, pure I m. 152-3°; yield, 28 g. (45%). I colorless needles of the bisulfite compound, I. $NaHSO_4$  ("4" (4 g.) in 15 cc. 64.5%  $H_2SO_4$ , is heated to boiling, cooled apparently a typographical error, which yields I on treatment rapidly, and the brown crystals are filtered, washed with ment with alkali. II does not form a bisulfite compl. glacial AcOH and dried by a stream of air, then in *vacuo* under these conditions. I (1.5 g.) in 15 cc. EtOH and 15 over KOH; I. $H_2SO_4$ , m. 190.5-2.5° (unsharp), yields I cc.  $H_2O$ , heated on a water bath, were treated with 100 cc. on decompn. with  $H_2O$ . A somewhat purer product, m. almost neutral 7% soln. of hypochlorite, contg. a min. 191-2°, is obtained on crystn. from a 3:7 mixt. of 68% amt. of NaCl; the mixt. was heated for 1 hr., cooled, filtered, and the filtrate acidified by HCl, yielding 1.35 g. of by solu. of 3 g. I in 25 cc. 97% AcOH, followed by treatment with  $naphthalic anhydride$ , m. 262-3° (purified by pptn. by HCl ment with 1 cc.  $H_2SO_4$  in the cold; the sulfate ppts. as from EtOH- $NH_4OH$ ). I (1.5 g.) was added to 100 cc. well-formed yellow plates, m. 191.5-3° (decompn.). I almost neutral 7% hypochlorite soln., heated for 1 hr. on a (1.5 g.) dissolved in 30 cc.  $HNO_3$  (d. 1.4), heating not water bath, cooled, filtered, and the filtrate acidified by above 50°, is cooled thoroughly and the yellow-orange HCl, yielding a ppt. of a *chironaphthalic anhydride, m. 203.5-4.5° (from EtOH); the position of the Cl was not established. II could not be oxidized or chlorinated under *vacuo*. I nitrate, m. 81.5-2°, decomps. on treatment with  $H_2O$  to yield I. The nitrate has a compn. between the conditions used above.*

NO PROPERTIES INDEX

41.6HNO<sub>3</sub> and 41.7HNO<sub>3</sub>. The prepn. was repeated in AcOH soln.: 3 g. I in 10 cc. glacial AcOH is treated with 10 cc.  $HNO_3$  (d. 1.4) in the cold, let stand for several hrs., and the yellow crystals are filtered and dried; they m. 85.5-6°, mixed m. p. (with nitrate from  $HNO_3$  alone) 82.2-3°. The compn. of this product is I.2HNO<sub>3</sub>. It may be crystd. from MePh. The HCl salt of I was prepd. as follows: 1 g. I in 5 cc. HCl (d. 1.19) was treated with 3 cc.  $H_2O$ , yielding an orange-brown ppt., m. 82-3.5°, which was found to lose HCl gradually when dried in *vacuo* over KOH or in a stream of dry air. Passing a stream of HCl gas into a benzene soln. of I ppts. at first a red HCl salt, then an orange-yellow salt of somewhat higher HCl content than the 1st; both salts contain appreciably less HCl than which time a test portion shows absence of unreacted theory for I.HCl. I hydrobromide was prepd. by passing naphthol. The mass is cooled and filtered. The filtrate dry HBr into a benzene soln. of I, yellow needles, m. 159.8-30-5°, filtered, washed with cold  $H_2O$  and dried. The 50 cc.  $H_2O$  treated at the boiling point with 320 cc. 18.5% crude I so obtained weighs 34 g., m. 149-51°. Crystd. soln. of  $NaHSO_4$ , yields on cooling, filtration and concn. from dil. EtOH, pure I m. 152-3°; yield, 28 g. (45%). I colorless needles of the bisulfite compound, I. $NaHSO_4$  ("4" (4 g.) in 15 cc. 64.5%  $H_2SO_4$ , is heated to boiling, cooled apparently a typographical error, which yields I on treatment rapidly, and the brown crystals are filtered, washed with ment with alkali. II does not form a bisulfite compl. glacial AcOH and dried by a stream of air, then in *vacuo* under these conditions. I (1.5 g.) in 15 cc. EtOH and 15 over KOH; I. $H_2SO_4$ , m. 190.5-2.5° (unsharp), yields I cc.  $H_2O$ , heated on a water bath, were treated with 100 cc. on decompn. with  $H_2O$ . A somewhat purer product, m. almost neutral 7% soln. of hypochlorite, contg. a min. 191-2°, is obtained on crystn. from a 3:7 mixt. of 68% amt. of NaCl; the mixt. was heated for 1 hr., cooled, filtered, and the filtrate acidified by HCl, yielding 1.35 g. of by solu. of 3 g. I in 25 cc. 97% AcOH, followed by treatment with  $naphthalic anhydride$ , m. 262-3° (purified by pptn. by HCl ment with 1 cc.  $H_2SO_4$  in the cold; the sulfate ppts. as from EtOH- $NH_4OH$ ). I (1.5 g.) was added to 100 cc. well-formed yellow plates, m. 191.5-3° (decompn.). I almost neutral 7% hypochlorite soln., heated for 1 hr. on a (1.5 g.) dissolved in 30 cc.  $HNO_3$  (d. 1.4), heating not water bath, cooled, filtered, and the filtrate acidified by above 50°, is cooled thoroughly and the yellow-orange HCl, yielding a ppt. of a *chironaphthalic anhydride*, m. 203.5-4.5° (from EtOH); the position of the Cl was not established. II could not be oxidized or chlorinated under *vacuo*. I nitrate, m. 81.5-2°, decomps. on treatment with  $H_2O$  to yield I. The nitrate has a compn. between the conditions used above.

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117 AND 118 CODES) PROCESSING AND PROPERTIES INDEX

BC C-2

746. Polymers, compounds. III. Polymers, bromide. (Determination of active bromine) A. M. Lakin (Bull. Acad. Sci. U.S.S.R., 1941, Ch. Sci. Chem.: 646—675).—Gravimetric determination of "active" Br is carried out by converting the halide into the iodized form by means of alcoholic  $\text{NH}_4\text{I}$ . Br contents found by this method are 1—2% < those obtained by means of the micro-Carius technique. No experimental details are given. V. B.

555-55A METALLURGICAL LITERATURE CLASSIFICATION

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COMMON ELEMENTS		PROCESSING AND PROPERTIES INDEX	
<p>10</p> <p>Sulfonoxides of polycyclic ketones. A. M. Lukin and G. B. Zavarikhina (Inst. of Org. Chem., Acad. Sci. U.R.S.S.). <i>Compt. rend. acad. sci. U.R.S.S.</i> 55, 617-20 (1947); cf. Courtot and Bonnet, <i>C.R.</i> 20, 2153, and preceding abstr.—Polycyclic ketones (I) in the finely divided state or in an inert solvent, such as polychlorinated benzene, form complexes (sulfonoxides) with gaseous SO<sub>2</sub> (II). The sulfonoxides are much more highly colored than the initial ketones and are frequently insol. in the solvent in which they are formed. They are stable at ordinary temps., but decomp. at about 100° or in the presence of water. The molar proportion of II/I varies with the constitution of I but is 1.5 in the cases of benzonaphthone (C<sub>12</sub>H<sub>8</sub>O) and benzanthrone (C<sub>12</sub>H<sub>6</sub>O) and 2.0 in the case of <i>trans</i>-libenzopyrenequinone (C<sub>14</sub>H<sub>8</sub>O<sub>2</sub>) and <i>trans</i>-dibenzanthrone. W. S. Port</p>		<p>10</p>	
ASACSLA DETAILING LITERATURE CLASSIFICATION			
<p>SECONDARY</p> <p>10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100</p>		<p>10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100</p>	

1ST AND 2ND COLUMNS																										3RD AND 4TH COLUMNS																									
PROCESSES AND PROPERTIES INDEX																																																			
<div style="display: flex; justify-content: space-between;"> <span>CA</span> <span>10</span> </div> <p>Nitrosides of polycyclic ketones. A. M. Lukin and L. D. Dachevskaya. <i>Compt. rend. acad. sci. P.R.S.S.</i> 55, 825-8(1947); cf. Lauer and Atarashi, <i>C.A.</i> 29, 68801, and following abstr. - Polycyclic ketones, either finely divided or in an inert solvent (e.g., Et<sub>2</sub>O, C<sub>6</sub>H<sub>6</sub>, or CCl<sub>4</sub>) react with NO<sub>2</sub> to form addn. compds. called nitrosides. Some nitrosides (e.g. of anthraquinone) are very unstable, being observable but not isolatable, whereas others (e.g. of 9-fluorenone (benzonaphthone, C<sub>11</sub>H<sub>6</sub>O)) can be recrystd. They are decompd. by water. The colors of the addn. compds. are different from those of the ketone but the difference is not as marked as in the case of the corresponding sulfonoxides. In the case of benzanthrone (C<sub>11</sub>H<sub>6</sub>O) (I), an addn. compd. contg. 2 mols. 1 mol. NO<sub>2</sub> was obtained in 15 min. at 20°, using 7 mols. NO<sub>2</sub>/mol. I. No nitro deriv. was obtained. W. S. Port</p>																																																			
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MATERIALS INDEX																																																			

LUKIN, A. M.

PA 11<sup>T</sup>71

USSR/Chemistry - Cyclic compounds  
Chemistry - Sulfuric acid

Apr 1947

"The Coloring of Polycycloketone Solutions with  
Sulfuric Acid," A. M. Lukin, G. B. Zavarikhina, 5 pp

"CR Acad Sci" Vol LVI, No 2

Discussion of the phenomenon in which polycyclic  
compounds are colored by sulfuric acid. Three graphs  
showing the variation in color (millimicrons of wave  
length) with other characteristics, obtained by means  
of the spectrodensograph of Goldberg for various  
compounds.

11<sup>T</sup>71

CA

Organic Chemistry - 10

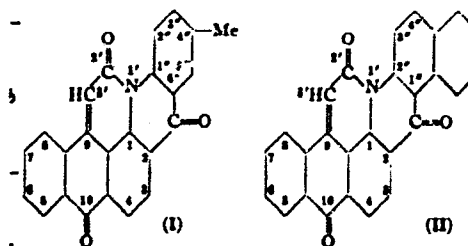
Sulfone oxides of polycycloketones as intermediates in sulfonation with sulfur trioxide. A. M. Lukin and G. B. Zavarikhina. *Doklady Akad. Nauk S.S.S.R.* 24, 1063 (1947). Passage of 0.03 g. vaporized  $\text{SO}_3$  through 2.3 g. powder benzanthrone at  $0^\circ$  over 20-30 min. gave a red coloration and after air-blowing the product was washed with  $\text{CCl}_4$ , leaving behind 3.07 g. sulfonoxide,  $\text{C}_{14}\text{H}_8\text{O}_2\text{SO}_2$  (92.0%). The sulfonoxide kept 2 hrs. at  $170-80^\circ$  and the product treated with  $\text{H}_2\text{O}$  gives 23% benzanthrone and 76.8% benzanthrone-sulfonic acid, isolated as the Ba salt. Only traces of the sulfonic acid form during the reaction with  $\text{SO}_3$  if moisture is kept out. The limiting amt. of  $\text{SO}_3$  that can react is 2 moles, i.e. with formation of a disulfonide, in the cases of *trans*-dibenzanthrone, *trans*-dibenzopyrenequinone, benzanthrone, and benzonaphthone. Direct action of  $\text{SO}_3$  on the polycyclic ketones causes some oxidative changes.

G. M. Kosolapoff



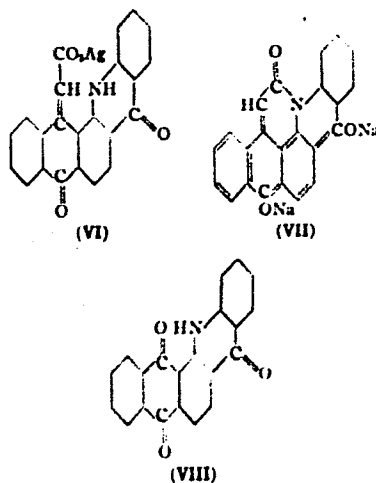
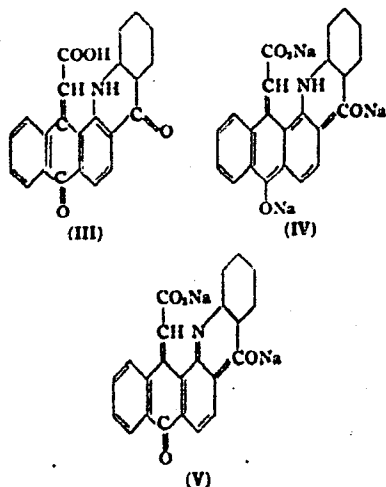
Polycyclic compounds. VII. Theory of formation of benzanthrone from anthraquinone. A. M. Lukin. *Zhur. Obshch. Khim.* (J. Gen. Chem.) 18, 308-15 (1948); cf. C.A. 42, 5443a. —Contrary to the accepted theory, the principal intermediate in the formation of benzanthrone (I) from anthraquinone (II) is not anthrone, but hydroxyanthrone; the actual reaction course depends upon the exptl. procedures used. Addn. of 15.5 g. 89% glycerol and 5.14 g.  $\text{CuSO}_4$  in 22 g.  $\text{H}_2\text{O}$  to 21 g. II in 268 g. 93%  $\text{H}_2\text{SO}_4$  over 30 min. at  $90^\circ$ , and addn. of 9.5 g. powd. Zn over 2-2.5 hrs. at  $105^\circ$  and stirring 3-4 hrs. gives 23 g. I. Detn. of the II evolved in the process gave 2.7 l./g.-mole II and the evolution is complete in the 1st 2 hrs. If  $\text{CuSO}_4$  is omitted, the yield is only 87%; Fe gives complete reaction in 10-12 hrs. at 1.8 g. atoms Fe/mole II; the combined use of Fe and  $\text{CuSO}_4$  gives an 85-6% yield; Al leads to the formation of anthrone, which then yields I. II (10.5 g.) in 166.5 g. 94.6%  $\text{H}_2\text{SO}_4$  treated with 1.6 g. Al at  $20^\circ$ , stirred 3-4 hrs. at  $30-5^\circ$ , let stand overnight, treated with 10.5 g. II and 98.5 g.  $\text{H}_2\text{SO}_4$ , then with 14 g. glycerol and 29 g.  $\text{H}_2\text{O}$  over 0.5 hr. at  $90^\circ$ , heated to  $110^\circ$  in 2 hrs., and kept at  $110^\circ$  4 hrs. gave upon aq. treatment 21 g. product contg. 40% II and 52% I. If the reaction mixt. is quenched in water before addn. of the 2nd portion of II, 96% anthrone, m.  $154-5^\circ$ , is obtained. In mixts. of this and II treated under the above conditions there was no reaction with the II present. To 10.5 g. II in 110.5 g. 94%  $\text{H}_2\text{SO}_4$  was added 13 ml.  $\text{H}_2\text{O}$  in 15 min. (temp. rose to  $80^\circ$ ) and after 2 hrs. 22.1 g.  $\text{H}_2\text{SO}_4$ , 2.5 ml.  $\text{H}_2\text{O}$ , 14.5 g. glycerol, and 7 g.  $\text{PhNH}_2$  were added; the temp. rose to  $110-15^\circ$ , at which point the mixt. was kept 5-6 hrs. to give upon quenching 12.2 g. product contg. a 90% yield of I, while from the mother liquor was isolated 30% quinoline. VIII. Benzanaphthosous nitrosoxide. A. M. Lukin and L. D. Daskovskaya. *Ibid.* 18, 1703-9 (1948). —The primary product of  $\text{NO}_2$  with benzanaphthene is a mol. complex, benzanaphthosous nitrosoxide,  $\text{C}_{14}\text{H}_8\text{O}_2\text{NO}_2$ , yellow-orange, m.  $80-5^\circ$  (crude),  $92-3^\circ$  (from  $\text{CCl}_4$ ), obtained in 17-18% yield from the components in  $\text{CCl}_4$  at  $0-5^\circ$ . Concn. of the mother liquor gives another crop; total yield 92.7%. Preps. from various ratios of the components have the same compn.; with water or dil.  $\text{NaOH}$  the components are

regenerated. Direct passage of  $\text{NO}_2$  over benzanaphthene at  $7-8^\circ$  slowly gives the same product, m.  $90-1^\circ$  (from  $\text{CCl}_4$ ), indicating that  $\text{CCl}_4$  greatly facilitates the complex formation. IX. Synthesis of methyl- and benzanthrpyridonacridones. A. M. Lukin and P. M. Aronovich. *Ibid.* 19, 354-61 (1949); cf. C.A. 34, 2719'. — $\text{MgO}$  (5 g.) in 100 ml.  $\text{H}_2\text{O}$  boiled 15 min., treated with 8.5 g.  $\text{Na}_2\text{CO}_3$ , 10 g. *p*-toluidine, and 10 g. 1-nitro-2-carboxyanthraquinone and refluxed 15 hrs. gave after filtration and extrn. of the ppt. by hot water and acidification of the alk. soln., 97% 1-(*p*-tolylamino)-2-carboxyanthraquinone, m.  $275-6^\circ$  (from AcOH). This (10 g.) boiled with 20 ml. AcOH in 30 ml. AcOH 10 min. gave 95% *N*-Ac deriv., m.  $381^\circ$  (decomp.), from 80% AcOH BuOH). This (5 g.) boiled 10 hrs. with 200 ml. 0.8%  $\text{NaOH}$  gave 90% *N*-(*p*-tolyl)-1,9-anthrpyridone-2-carboxylic acid, yellow needles, decomp. about  $320^\circ$  (from AcOH-BuOH). This (5 g.) warmed to  $40-5^\circ$  with 25 ml.  $\text{ClSO}_3\text{H}$  and poured on ice gave 98% 4'-methyl-1,9-anthrpyridonacridone (I), m.  $354-5^\circ$  (from *o*- $\text{C}_6\text{H}_5\text{Cl}$ ), which gives a violet dye with alk. Na hydrosulfite. A similar sequence starting with 2- $\text{C}_6\text{H}_5\text{NH}_2$  gave, in turn, 90% 1-(2-naphthylamino)-2-carboxyanthraquinone, m.  $259-60^\circ$  (from AcOH); its *N*-Ac deriv., yellow needles (from AcOH) which on heating to  $170-80^\circ$  gives benzanthrpyridonacridone (II); 94% *N*-(2-naphthyl)-1,9-anthrpyridone-2-carboxylic acid, m.  $324-5^\circ$  (from BuOH); and the latter on stirring 1 hr. at room temp. with concd.  $\text{H}_2\text{SO}_4$  gave 91% II, m. above  $300^\circ$  (from dil.  $\text{H}_2\text{SO}_4$ -AcOH). II gives a blue dye with



alk. soln. of Na hydrosulfite. X. Reaction of anthra-pyridonacridones with alkali. *Ibid.* 362-8.—Anthra-pyridonacridone opens its pyridone ring under the influence of alkali, especially in the presence of Na hydrosulfite, to form the acid 9-methyleneanthracridone-9-carboxylic acid (III). Anthrapyridonacridone (5 g.) in 50 ml. 10% NaOH and 2 l. H<sub>2</sub>O forms a violet soln. on addn. of 20 g. Na hydrosulfite; the violet color of the di-Na salt of the di-enol becomes yellow on addn. of acids—the color of the free leuco base. If the alk. soln. is permitted to stand 1 hr., complete conversion to a brown soln. of IV takes place, which on oxidation by air becomes orange (V) and after acidification yields III; addn. of NaOH to III yields V. The best yield of III is obtained by boiling 3 g. of the

gives 74% VIII on boiling and washing the product with dil. H<sub>2</sub>SO<sub>4</sub> and NaHSO<sub>4</sub>; VIII forms violet needles, m. 241-3° (from o-C<sub>10</sub>H<sub>7</sub>Cl<sub>2</sub>). I (5 g.) undergoes similar changes on treatment with 50 ml. 10% NaOH in 2 l. water and 20 g. Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>; the brown soln., filtered after standing 1 hr. and acidified, gives the 4'-Me deriv. of III (76%), brownish powder, which on heating changes to I. If treated similarly gives the 4,5-benzo deriv. of III, light-brown powder, giving orange solns. with alk. reagents and red with concd. H<sub>2</sub>SO<sub>4</sub>.



G. M. Kosolapoff

LUKIN, A. M.

PA 30/49T17

USSR/Chemistry - Ketone, Naphthyl Phenyl, Sep 48  
Nitro Oxide of  
Chemistry - Synthesis

"Research in the Field of Polycyclic Compounds:  
VIII, Nitro Oxide of Benzonaphthone," A. M. Lukin,  
L. D. Dashevskaya, Sci Res Inst of Org Intermedi-  
ary Products and Dyestuffs imeni K. Voroshilov,  
Moscow, 6½ pp

"Zhur Obshch Khimii" Vol XVIII, No 9

The addition product of NO<sub>2</sub> and naphthyl phenyl  
ketone was prepared for the first time, and its  
properties studied. Submitted 17 Aug 47.

30/49T17

CA

Sulfates of polycyclic ketones. A. M. Lukin and O. B. Zayarnikova, Doklady Akad. Nauk S.S.S.R., 59, 105-8 (1948). - Meller's hypothesis (Org. Nomenclature, p. 307 (C.A. 21, 3638)), according to which sulfates of polycyclic ketones are intermediates in the sulfonation of such ketones, must be rejected as untenable. More probably, in the high concn. of H<sub>2</sub>SO<sub>4</sub> necessary for reaction, the sulfonoxides (C.A. 42, 550c) of the ketones are the true intermediates; this is shown indirectly by color comparison experiments; some of such ketone sulfates and sulfonoxides (C.A. 42, 550f) were washed with water. It was found that free H<sub>2</sub>SO<sub>4</sub> may be washed away from the ketone sulfates most readily by means of AcOAc at -15°, when the sulfates are not affected by it; AcOAc traces can be removed by CCl<sub>4</sub> washing. Pyranthrone in 86.8% H<sub>2</sub>SO<sub>4</sub> gave a sulfate 2R.31HSO<sub>4</sub>, blue-throne in 86.8% H<sub>2</sub>SO<sub>4</sub> gave brown R.H<sub>2</sub>SO<sub>4</sub>, violet crystals, while 88.6% H<sub>2</sub>SO<sub>4</sub> gave brown R.H<sub>2</sub>SO<sub>4</sub>. Thus a given ketone can form more than 1 sulfate, each of different color; sulfonoxides, however, have almost the same color in spite of different compns. which may arise. The color being that of the soln. of the ketone in H<sub>2</sub>SO<sub>4</sub>, this color being that of the soln. of the ketone in H<sub>2</sub>SO<sub>4</sub>, making sulfates of pyranthrone or benzonaphthone at -20° failed to give any sulfonic acids; the sulfates were perfectly stable under dry conditions at this temp. (G. M. Kmolapoff)

G. M. Kozlov

CA

The reactive forms of sulfuric acid and its simplest derivatives (the theory of sulfonation). A. M. Lukin, *Doklady Akad. Nauk S.S.S.R.* 60, 691-4 (1948). The dual nature of  $H_2SO_4$ , behaving either as  $H^+H_2SO_4^+$  or a  $H_2SO_4SO_3$ , is apparent from its reaction with polycyclic ketones, resulting either in sulfates  $RR'CO.H_2SO_4$  (L. and Zavarikhina, *Ibid.* 58, No. 9(1947)) or sulfonoxides  $RR'CO.SO_3$  (L. and Z., *ibid.* 42, 554). The 1st reaction is favored by a lower concn. of the  $H_2SO_4$  and by lower temp., the 2nd by higher concn. and higher temp., i.e., the very conditions favorable to sulfonation of aromatic compds. Consequently, it is normal to assume that sulfonoxides are the intermediate product in sulfonation, only in certain cases, particularly in the presence of strongly polar substituents, does sulfonation proceed at low concns. of  $H_2SO_4$ , as in the case of PhOH; in such cases,  $H_2SO_4$  evidently acts in its  $H^+H_2SO_4^+$  form, and the intermediate products are other than sulfonoxides. The same duality may be attributed to derivs. such as  $MeHSO_3$ ,  $MeSO_3$ , and  $SO_3ClH$ , the latter acting either as  $H^+SO_3Cl^-$  or  $SO_3.HCl$ . This view is borne out by examples of dual ways of reaction, such as either methylation or sulfonation with  $Me_2SO_3$ , depending on whether it acts as  $Me_2SO_3$  or as  $Me_2O.SO_3$ . N. Thon

## N. Thurn

Polycyclic compounds. IX. Synthesis of methyl-  
and benzanthracyridonacridones. A. M. Lukin and  
P. M. Aronovich (Acad. Sci., U.S.S.R.). *J. Gen. Chem.*  
U.S.S.R. 19, 319-22(1949) (Engl. translation). X.  
Action of alkali on anthracyridonacridones. *Ibid.* 323-8.  
—See C.A. 44, 1079h. E. J. C.

LUKIN, A. M.

"Research in the field of polycyclic compounds: IX. Synthesis of methyl-and benz-anthrapyridene-scridones".

Lukin, A. M. and Aronovich, P. M. (p. 358)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1949, Vol. 19, No. 2

LUKIN, A. M.

"Research in the field of polycyclic compounds: X. The interaction of anthrapyridene-acridones with alkali".

Lukin, A. M. and Aronovich, P. M. (P. 362)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1949, Vol. 19, No. 2



LUKIN, A.M.

Sulfonation of polycarbocyclic ketones. Voprosy Anilinokrasochnoy Khim.,  
Trudy VIII Soveshchaniya Khim. i Tekh. (Trans. 8th Aniline Dye Conf.)  
'50, 135-66. (MLRA 4:4)  
(CA 47 no.21:11172 '53)

10

CA

Polycyclic compounds XI. Effect of substituents on the color of 1-amino-4-substituted-anthraquinones. A. M. Lukin and K. K. Morzova (Inst. Org. Chem., Acad. Sci. U.S.S.R.). *Zhur. Obshchei Khim.* (J. Gen. Chem.) 30, 1504-9 (1955); cf. *C.A.* 34, 3749<sup>1</sup>; 44, 1089c.—The shift toward absorption of longer waves occurs in the order: NO<sub>2</sub>, Cl, Br, MeO, HO, NH<sub>2</sub>, NH<sub>3</sub>, NMe<sub>2</sub>, NHPh. The relative position of the 1st 3 is different from that given by Schmidt (*C.A.* 22, 4232), probably because of different methods of observation (spectrodensimetrically here; visually by Schmidt). All derivs. with HO or NH<sub>2</sub> or their derivs. give 2 max., while other 1,4-derivs. have only one. The absorption curves of all products are reproduced. 1-Amino-anthraquinone m. 253.5-4.5° (by sublimation). Nitration of Bz deriv. with mixed acid at 4-5° gave 1-amino-4-nitro-anthraquinone m. 295° (from PhNO<sub>2</sub>, PhCl, AcOH), absorption max. in PhCl 440 mμ, in EtOH 474. Debenzylation of Alcol Red G with H<sub>2</sub>SO<sub>4</sub> at 100° gave 90% 1-amino-4-methoxyanthraquinone, m. 106.5-7.5° (from dil. AcOH), max. 502 (PhCl), 513 (EtOH). Heating p-BzNHCH<sub>2</sub>OH and o-CaH<sub>2</sub>(CO)<sub>2</sub>O with AlCl<sub>3</sub>-NaCl and oxidation of the 1-benzamido-4-hydroxyanthraquinone with H<sub>2</sub>O<sub>2</sub> and hydrolysis with 100% H<sub>2</sub>SO<sub>4</sub> gave 70% 1-amino-4-hydroxyanthraquinone, m. 206.5-7.5° (from PhCl), max. 520 and 550 (PhCl), 525 and 550 (EtOH). 1,4-Diaminoanthraquinone, m. 267-7.5° (sublimed), max. 535 and 568 (PhCl), 511 and 584 (EtOH). 1-Amino-4-benzamidoanthraquinone, m. 279.5-81.0° (from PhCl), max. 525 and 558 (PhCl), 530 and 562 (EtOH). Condensation of 1-amino-4-bromo-2-

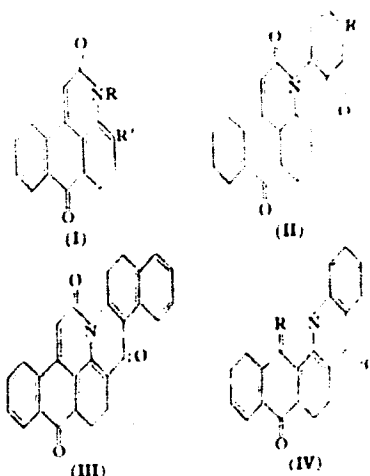
with-anthraquinone (I) with Me<sub>2</sub>NH in aq. CuSO<sub>4</sub> gave 60% 1-amino-4-(dimethylamino)anthraquinone, blue, m. 159.5-81.0°, max. 565 and 604 (PhCl), 565 and 604 (EtOH). Heating I with PhNH<sub>2</sub> in aq. CuSO<sub>4</sub> and treatment with Na<sub>2</sub>SO<sub>4</sub> gave 60% 1-amino-4-anilinoanthraquinone, m. 172.5-5°, max. 565 and 604 (PhCl), 565 and 600 (EtOH). 1-Aminoanthraquinone has max. 460 (PhCl), 475 (EtOH). XII. Effect of substituents on the color of 1-benzamido-4-substituted-anthraquinones. *Ibid.* 1510-13.—The order of absorption max. displacement by substituents is the same as that found for the 1-amino series. Benzoylation of 1-aminoanthraquinone gave 92% 1-benzamidoanthraquinone, golden yellow, m. 254.5-5.5°, max. 435 mμ (PhCl). Nitration gave the 4-nitro deriv., m. 294-1° (from PhNO<sub>2</sub>), max. 435. 1-Benzamido-4-methoxyanthraquinone (by crystn. of Alcol Red G from xylene), m. 245.4-6.4°, max. 462. The 4-H<sub>2</sub> analog (by benzoylation of the 1-amino analog), m. 253.5-4.0° (from PhCl), max. 492. 1,4-Dibenzamidoanthraquinone, m. 279-9.5° (from PhCl), max. 498. Benzoylation of 1-amino-4-(dimethylamino)anthraquinone gave the 1-benzamido deriv., m. 172-4° (from PhCl), abs. max. 552. Similarly was prepd. 1-benzamido-4-anilinoanthraquinone, blue, m. 195-7° (from PhCl), max. 551. The 4-Cl analog, max. 440; 4-Br analog, max. 441 mμ. G. M. K.

LUKIN, A. M.

10

CA

Polycyclic compounds. XIII. Absorption spectra of anthrapyridone-acridone, anthraquinone-acridone, anthra-pyridone, and some of their derivatives. A. M. Lukin, P. M. Aronovich, and G. P. Brin. *Zhur. Obshchei Khim.* (J. Gen. Chem.) 20, 2210-21 (1950); cf. *C.A.* 34, 3749; 44, 10794; 45, 2406c. Treatment of 0.74 g. *N*-phenyl-1(*N*),9-anthrapyridone-2-carboxylic acid (I, R = Ph, R' = CO<sub>2</sub>H) and 0.17 g. NaHCO<sub>3</sub> in 50 ml. H<sub>2</sub>O with 0.34 g. AgNO<sub>3</sub> gave a yellow-green Ag salt, which, dried and boiled 1.5 hrs. with 3 ml. MeI, yielded the Me ester (II, R = Ph, R' = CO<sub>2</sub>Me), m. 243-3.5° (from MeOH and 60% AcOH). Absorption spectra of this and related compds. are reproduced and are characterized as follows: Anthrapyridone-



acridone (II, R = H) gives max. at 330 and 270 mμ; anthra-pyridone-5'-methylacridone (II, R = Me) at 340 and 380 mμ; anthrapyridone-5',6'-benzacridone (III) has a min. at about 380 and weak max. at 500 mμ; anthrone-2,1(*N*)-acridone-9-methylenecarboxylic acid (IV, R = :CHCO<sub>2</sub>H) and anthraquinone-2,1(*N*)-acridone (IV, R = O) have

max. at 365-70 mμ, thus confirming the structure of the former; *N*-methyl-1(*N*),9-anthrapyridone (I, R = Me, R' = H) has max. at 340 mμ and 400 mμ, while the above Me ester has max. at 310 and 405 mμ. The detns. were made in 94% H<sub>2</sub>SO<sub>4</sub>. G. M. Kosolapoff

1937

Lukin, A. M.

1123

THE BERYLLON I AND II AS NEW REAGENTS FOR  
COLORIMETRIC DETERMINATION OF BERYLLIUM  
A. M. Lukin and G. P. Zavaritskii (Moscow All Union  
Research Inst. of Chemical Reagents) Zhur. Anal. Khim.

11, 393-9 (1956) July-Aug. (in Russian)

A new reagent for Be in a field of azo dyes, containing  
chromotropic acid residue has been found. Ten dyes with  
amino substituent by derivatives of benzene, three of  
naphthalene and one of anthraquinone have been prepared.  
The diazo-B-acid proved to be the most advantageous re-  
agent for Be. It is stable in alkaline media, very soluble  
in water, and has the sensitivity limit of 0.2  $\gamma$  Be in 5 ml

at pH 12 to 13. Its use in conjunction with trelon B, makes  
it more selective as a reagent for Be. (R.V.J.)

LM LFH

Lucina, A. M.

✓ New reagents for the colorimetric determination of beryllium.  
Lucina, A. M. and G. A. Zaitseva.  
Zhurnal. Anal. Chem. U.S.S.R. 11, 499-500 (1956) (English  
translation).—See C.A. 51, 13640i.  
B.M.R.

1/1 3

Distr: 4E4j

BM

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LUKIN, A.M.

Quantitative determination of gelatin. A. M. Lukin,  
G. B. Karamovich, G. B. Zaborikhina, and L. A. Iodova.  
U.S.S.R. 104,743, Jan. 25, 1957. Ca. 13 refs. Character-  
ized by using as reagents the addn. products of H acid  
with 2-amino-4-nitro-6-chlorophenol or with 2-amino-6-  
chlorophenol-4-sulfonic acid in alk. medium. M. Hosh.

pm mt

LUKIN, A.M.; KALININA, I.D.

Synthesis of o-oxy- and o-aminobenzolphosphonic acids, their  
substitutes and azo dyes derived from them. Khim. nauka i prom.  
2 no.3:400 '57. (MLBA 10:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh  
reaktivov.

(Phosphonic acids) (Azo dyes)

LUKIN, A.M.; PETROVA, G.S.

Research in the fields of polycyclic compounds. Part 14: Synthesis of anthraquinone-1-arsonic and -1-phosphonic acid using the diazo method. Zhur. ob. khim. 27 no.8:2171-2174 Ag '57. (MIRA 10:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov.

(Anthraquinone) (Arsonic acids) (Phosphonic acids)



AUTHORS: Lukin, A. M., Zavarikhina, G. B.

75-1-10/26

TITLE: Gallion - a New Reagent for the Photometric Determination of Gallium (O novom reaktivе dlya fotometricheskogo opredeleniya galliya - gallione)  
1. Concerning the Problem of the Influence Exerted by Substituents Upon the Properties of Organic Reagents (Soobshcheniye 1. K voprosu o vliyanii zamestiteley na svoystva organicheskikh reaktivov)

PERIODICAL: Zhurnal Analiticheskoy Khimii, 1958, Vol. 13, Nr 1, pp. 66-71 (USSR)

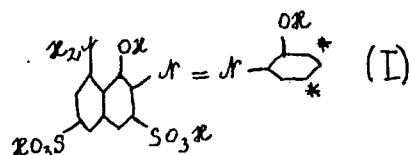
ABSTRACT: The authors investigated monoazo dyes which contain the o - o' - dioxyazo grouping as characteristic analytically functional groups. From the large number of representatives of this series of compounds the authors especially investigated those obtained by the coupling of diazo compounds of o-aminophenol and its substituted derivatives with  $\beta$ -naphthol and its sulfonic acids, chromotropic acid and H-acid, as well as a number of other azo compounds. In the present article only the results of the coupling products

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Gallion - a New Reagent for the Photometric Determination of Gallium. 75-1-10/26

1. Concerning the Problem of the Influence Exerted by Substituents Upon the Properties of Organic Reagents

with H - acid in an alkaline solution are given (formula I)

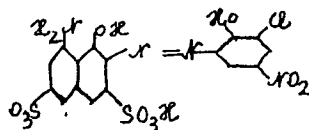


$NO_2$ ,  $HSO_3$  and  $Cl$  were taken as substituents of o-amino-phenol. Only the mono- and di-substituted o-aminophenols which exclusively contain the substituents in an ortho- or para-position to the hydroxyl group were investigated. (\* in formula I). The compound of formula I is of no importance as a reagent without further substituents. But in an acid aqueous solution in the presence of 50% gallium it changes its color from raspberry red to reddish-violet. According to this principle the influence of substituents on color by

Card 2/5

Gallion - a New Reagent for the Photometric Determination of Gallium 75-1-10/26  
 1. Concerning the Problem of the Influence Exerted by Substituents Upon the Properties of Organic Reagents

reaction with gallium ions was determined. Investigations showed that the nature, number and position of the introduced substituents exercise a strong influence upon the analytic properties of the azo compound. A nitro group in ortho-position to the hydroxyl group exercises a negative influence upon the analytic properties. Only 2 of the 12 compounds investigated showed usable properties for the photometric determination of gallium. In both cases the nitro group is in a para-position to the hydroxyl group. One of these compounds is especially distinguished by the contrast of coloring and deserves practical interest for the photometric gallium in rocks. This compound is called "gallion" (in chemical industry it is known under the name gallion MPEA) and has the following constitution:



Card 3/5

Gallion - a New Reagent for the Photometric Determination  
of Gallium.

75-1-10/26

1. Concerning the Problem of the Influence Exerted by  
Substituents Upon the Properties of Organic Reagents

It is a brick-red finely crystalline powder. The aqueous solution has a bluish crimson-red color. Gallion is practically insoluble in acetone, benzene and carbon tetrachloride. The change of color with gallium takes place from raspberry red to dark blue. The sensitivity of the determination of gallium with gallion amounts to 0,2  $\mu$  in 5 ml. Gallium is an example for the fact that the introduction of substituents is capable of transforming an initial compound which possesses no valuable analytic properties and therefore no practical importance into an important reagent. The best reagent for the photometric gallium determination hitherto described in publications is quinalizarin (references 36, 37). A comparison between gallion and quinalizarin shows that gallion possesses the better properties (reference 41). The synthesis of gallion is exactly described. It was performed under the participation of N. S. Simonovoy.

Card 4/5

Gallion - A New Reagent for the Photometric Determination of Gallium 75-1-10/26

1. Concerning the Problem of the Influence Exerted by Substituents Upon the Properties of Organic Reagents

There are 1 figure, 1 table, and 57 references, 18 of which are Slavic.

ASSOCIATION: All-Union Scientific Research Institute for Chemical Reagents, Moscow (Vsesoyuznyy nauchno - issledovatel'skiy institut khimicheskikh reaktivov, Moskva)

SUBMITTED: August 28, 1956

AVAILABLE: Library of Congress

1. Gallium - Determination
2. Gallium - Reagent
3. Photometry - Applications

Card 5/5

EUKIN, A.M.

PHASE I ANALYSIS 90/1910

Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov  
Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov  
and Reagents: Collection of articles. Moscow: Goskhimizdat, 1979.  
156 p. (Series: Izv. Vsesoyuznogo nauchno-issledovatel'skogo instituta khimicheskikh reaktivov, 23) First published: 1970  
copies printed.

Sponsoring Agency: USSR. Soviet Ministry. Goskhimizdatnyi komitet po khimii.

Ed.: Yu.V. Lyudskiy; Tech. Ed.: Ye.G. Shupak; Editorial Board of Series:  
Ye.G. Shupak, V.M. Dikich, R.P. Lashchinsky (Resp. Ed.), A.M. Eukin,  
G.S. Kalitov, G.I. Kibulyov, G.A. Pavlov (Deputy Resp. Ed.), and  
I.G. Shafren.

PURPOSE: This book is intended for personnel of chemical research and industrial  
chemical laboratories.

CONTENTS: The book contains 36 articles by specialists of the Scientific Research  
Institute for Chemical Reagents (VNIKh) treating methods which may be adapted  
by different branches of industry in producing, analyzing, and studying inor-  
ganic and organic substances of high purity. Physical, chemical, and reference  
accompany each article. No parameters are mentioned.

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Lukin, A.M.

PHASE I BOOK EXPLANATION SW/3910

Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov  
Vsesoyuznyy Vysokiy chistoty i reaktivnosti institut khimicheskikh reaktivov  
and Reagents: Collection of Articles) Moscow, Goskhimizdat, 1959.  
186 p. (Series: Khimicheskaya, vyp. 2) Entries slip inserted. 1,700  
copies printed.

Sponsoring Agency: USSR. Soviet Ministry. Goskhimizdatnyi komitet po khimii.  
Ed.: Yu.Ye. Izrael; Tech. Ed.: Ye.S. Shadr; Editorial Board of Series:  
V.G. Bruts', V.M. Dolgin, R.P. Isakovskiy (Sverd. fil.), A.M. Lukin,  
G.E. Mikhel', G.I. Mikhaylov, G.A. Petukhov (Sverd. fil.), and  
I.S. Shadrin.

PURPOSE: This book is intended for personnel of chemical research and industrial  
chemical laboratories.

CONTENTS: The book contains 96 articles by specialists of the Scientific Research  
Institute for Chemical Reagents (IIR) treating methods which may be adopted  
by different branches of industry in producing, analyzing, and studying inor-  
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AVAILABLE: Library of Congress

Card 6/6

24/m/003

LUKIN, A.M.; KARANOVICH, G.G.; PETROVA, G.S.

New reagent for the quantitative colorimetric determination of  
cadmium - cadion IIRA (water-soluble). Trudy IIRA no.23:  
55-62 '59. (MIRA 13:7)  
(Cadion) (Cadmium--Analysis)



LUKIE, A.M.; KALININA, I.D.

Synthesis of murexide, and composition of the product of  
its reaction with calcium. Trudy IRRA no.23:63-66 '59.  
(MIRA 13:7)

(Murexide) (Calcium compounds)

LUKIN, A.M.; ZAVARIKHINA, G.B.; SIMONOVA, N.S.

Analysis of aryl phosphinic acids. Trudy IREA no.23:106-112  
'59. (MIRA 13:7)

(Phosphinic acids)

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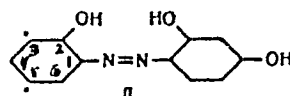
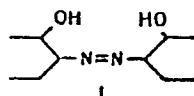
SOV/75-15-1-9/29

AUTHORS: Lukin, A. M., Bozhevol'nov, Ye. A.

TITLE: Concerning a New Reagent for Luminescent Determination of Gallium

PERIODICAL: Zhurnal analiticheskoy khimii, 1960, Vol 15, Nr 1, pp 43-48 (USSR)

ABSTRACT: The effect of different substituents in trihydroxyazo compounds (II) containing group (I) on the luminescent properties of the products of reaction between Ga and compounds II was studied in order to select a sensitive and selective reagent for fluorimetric determination of gallium.



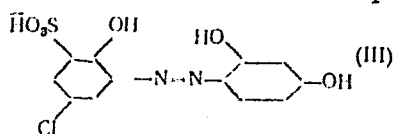
Card 1/8

Concerning a New Reagent for Luminescent  
Determination of Gallium

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SOV/75-15-1-9/29

The substituents are shown in Table 1, and their positions in formula II are denoted by an asterisk (positions 3 and 5). Fluorescence of solutions containing 0.2 ml of 0.01% of acetone solution of the reagent in 10 ml of test solution was measured at pH 3.5 using UM-2 monochromator and FEU-19 photomultiplier. The FUS-3 mercury-quartz lamp was used as the source. The fluorescence curves are shown in Fig. 1 and 2. It was found that the best reagent for luminescent determination of Ga is compound 3, which is manufactured by chemical industry under the name "Lumo-gallion IREA" (III). Compound 6 forms with Ga products of higher luminescence in isoamyl alcohol, but nonluminescent in aqueous solutions; compound III forms luminescent Ga complexes in both cases.



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Concerning a New Reagent for Luminescent  
Determination of Gallium

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Table 1. Characteristics of fluorescent reactions of Ga with azo dyes, obtained from resorcinol (formula II). (a) Serial Nr; (b) substituent in position (formula II); (c) sensitivity ( $\gamma$  Ga in 5 ml); (d) in aqueous solution; (e) in isoamyl alcohol.

a	b		c	
	3	5	d	e
1	H	H	0,4	0,05
2	H	Cl	0,6	0,1
3	SO <sub>3</sub> H	Cl	0,01	0,005
4	NO <sub>2</sub>	Cl	—	—
5	H	NO <sub>2</sub>	—	0,01
6	SO <sub>3</sub> H	NO <sub>2</sub>	—	0,003
7	NO <sub>2</sub>	NO <sub>2</sub>	—	—
8	Cl	NO <sub>2</sub>	—	0,1
9	H	SO <sub>3</sub> H	0,05	—
10	SO <sub>3</sub> H	SO <sub>3</sub> H	0,02	—
11	NO <sub>2</sub>	SO <sub>3</sub> H	—	—
12	Cl	SO <sub>3</sub> H	0,1	—

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\*dash denotes the absence of fluorescence with amounts of Ga less than 1.0 $\gamma$ .

Concerning a New Reagent for Luminescent  
Determination of Gallium

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SOV/75-15-1-9/29

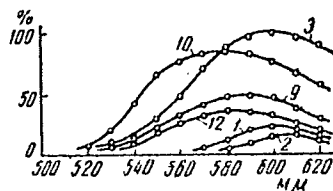


Fig. 1. Fluorescence spectra of aqueous solutions of gallium compounds with trihydroxyazo compounds. The curve's Nrs correspond to the compound Nrs in Table 1. On the ordinate are shown the intensities of fluorescence in comparison with fluorescence of compound 3 at 600 mμ, taken as 100%.

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Concerning a New Reagent for Luminescent  
Determination of Gallium

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SOV/75-15-1-9/29

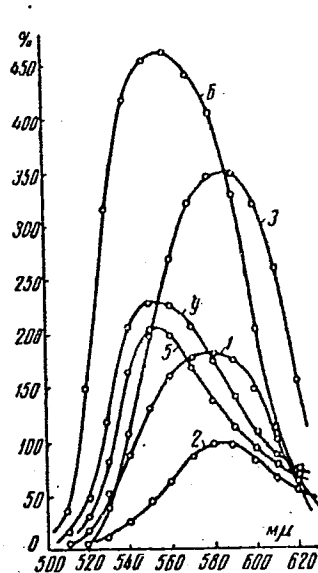


Fig. 2. Fluorescence spectra of compounds of gallium with trihydroxy-azo compounds in isoamyl alcohol. The curve's Nrs correspond to the compound Nrs in Table 1. The fluorescence intensity is shown in the same scale as in Fig. 1.

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Concerning a New Reagent for Luminescent  
Determination of Gallium

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SOV/75-15-1-9/29

Luminescent determination of Ga in Se was made using 2,2',4'-trihydroxy-5-chloro-1,1'-azobenzene-3-sulfonic acid (III). The results are shown in Table 2. Synthesis of the investigated compounds was made with the participation of G. B. Zavarykhina and N. S. Syzoyeva. There are 2 tables; 2 figures; and 20 references, 2 U.S., 2 U.K., 1 Czechoslovak, 3 German, 1 French, 11 Soviet. The U.S. and U.K. references are: Donald By, Freeman, C., White, Ch. E., J. Amer. Chem. Soc. 78, 2678 (1956); Charlot, G., Analyt. Chem. Acta 1, 218 (1947); Weissler, A.,

Card 6/8



Concerning a New Reagent for Luminescent  
Determination of Gallium

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SOV/75-15-1-9/29

Table 2. Determination of Ga in Se. (a) sample of  
Se (g); (b) Ga taken ( $\gamma$ ); (c) Ga found ( $\gamma$  in 5 ml);  
(d) content (%); (e) calculated; (f) found; (g)  
error (%).

(a)	(b)	(c)	(d)		(g)
			(e)	(f)	
0,106	0,000	0,003	—	$1,1 \cdot 10^{-5}$	—
0,114	0,05	0,018	$5,5 \cdot 10^{-5}$	$6,3 \cdot 10^{-5}$	+15
0,122	0,05	0,017	$5,3 \cdot 10^{-5}$	$5,6 \cdot 10^{-5}$	+6
0,104	0,10	0,026	$1,1 \cdot 10^{-4}$	$1,0 \cdot 10^{-4}$	-9
0,094	0,10	0,024	$1,2 \cdot 10^{-4}$	$1,02 \cdot 10^{-4}$	-15
0,124	0,20	0,048	$1,7 \cdot 10^{-4}$	$1,5 \cdot 10^{-4}$	-12
0,111	0,20	0,050	$1,9 \cdot 10^{-4}$	$1,9 \cdot 10^{-4}$	0

Card 7/8

Concerning a New Reagent for Luminescent  
Determination of Gallium

77747

SOV/75-15-1-9/29

White, Ch. E., Ind. Eng. Chem. Anal. Ed. 18, 530  
(1946); Radley, J. A., Analyst 68, 369 (1943).

ASSOCIATION: All-Union Scientific Research Institute of Chemical  
Reagents, Moscow (Vsesoyuznyy nauchno-issledovatel'skiy  
institut khimicheskikh reaktivov, Moskva)

SUBMITTED: June 27, 1958

Card 8/8

S/075/60/015/005/014/033/XX  
B005/B066

AUTHORS: Lukin, A. M. and Petrova, G. S.

TITLE: A New Reagent for Lead

PERIODICAL: Zhurnal analiticheskoy khimii, 1960, Vol. 15, No. 3,  
pp. 295 - 298

TEXT: When studying the analytical properties of the cadmium reagent Kadion (Ref.1) the authors observed that compound (I) gave a color reaction with lead ions (Ref.2). Since this compound, however, has no practical importance for the photometric determination of lead, the authors substituted the arsonic acid group for the sulfo group being in o-position with respect to the triazene grouping. The arsonic acid group reacts quantitatively with lead ions. In this way, compound (III) was obtained for the first time. Besides three further compounds with similar structure (IV), (V), (VI) were produced for the first time and tested for their capability of yielding color reactions with lead. M. P. Khoroshkova took part in the spectrophotometric measurements. The enclosed table shows the characteristics obtained. Compound (III), 4"-nitrobenzene-1",4-diazo-

Card 1/5

## A New Reagent for Lead

S/075/60/015/003/014/033/XX  
B005/B066

amino-1,1'-azobenzene-2"-arsono-4'-sulfonic acid forms with lead ions in a solution of sodium tetraborate a stable colored complex compound whose solutions obey Beer's law. The optical densities were measured in a ФЭК-M (FEK-M) colorimeter by using a green filter. The absorption maximum of the complex at pH~9 is at 500 mμ (Fig.1). Copper, zinc, cadmium, cobalt, nickel, lanthanum, uranium, and manganese (II) also form colored compounds with the reagent (III). Alkaline and alkaline-earth metals, further magnesium, arsenic, bismuth, tungsten, thallium (III), germanium, and gallium in amounts of 50γ do not disturb the determination of 1-10γ lead, nor do 25γ chromium, tellurium or yttrium, 10γ aluminum, beryllium or tin(IV), 5γ thorium and 2γ scandium. Iron, titanium, zirconium, vanadium, and molybdenum disturb. Smaller iron quantities (up to 20γ) may be masked by adding a 5% ammonium oxalate solution, higher quantities have to be removed in the form of the thiocyanate by extraction with isoamyl alcohol. The above-mentioned effects of foreign ions were studied by K.A. Smirnova. The reagent (III) is suited for the visual and photometric lead determination and may as well be used as metal indicator in the complexometric determination of lead and zinc. The new reagent has, compared with the frequently used dithizon, the advantage that in the determination of lead

Card 2/5

## A New Reagent for Lead

S/075/60/015/003/014/033/XX  
B005/B066

in the presence of other elements no cyanides are necessary for masking (copper may be masked by thiourea, zinc by potassium ferrocyanide). In addition to lead and zinc, also cadmium, uranium, lanthanum, and other elements can be determined by the new reagent. By means of the method of isomolar series (Ref.9) the authors found the reagent to react with lead in the molar ratio of 1 : 1. The reaction product has the structural formula (VII). The color change in the reaction is due to the reaction of lead with the arsonic acid group and with the triazene grouping of the reagent. Finally, the authors describe the synthesis of the reagent (III). 4-nitroaniline-2-arsonic acid is diazotized and then coupled with the sodium salt of the 4-amino-azobenzene-4'-sulfonic acid at 10-12°C. The reagent separates in the form of cherry-red crystals which may be recrystallized from acetone-water (1:1). N. A. Novikovskaya developed a semimicromethod of determining arsenic in the compound synthesized. The new reagent is supplied under the name of Sulfarsazen (sul'farsazen) by the authors' institute to the chemical industry and has already been tested satisfactorily by many organizations (Ref.8). There are 3 figures, 1 table, and 10 references: 8 Soviet, 1 Indian, and 1 Australian.

Card 3/5

A New Reagent for Lead

S/075/60/015/003/014/033/XX  
B005/B066

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov, Moskva (All-Union Scientific Research Institute of Chemical Reagents, Moscow)

SUBMITTED: February 26, 1958

Таблица\*

Характеристика  $2 \cdot 10^{-5}$  M растворов мышьяксо-  
держащих соединений в 0,05 M  
растворе  $\text{Na}_2\text{B}_4\text{O}_7$  (pH~9)

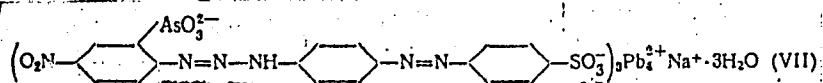
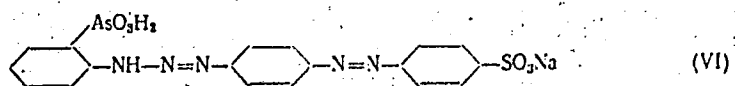
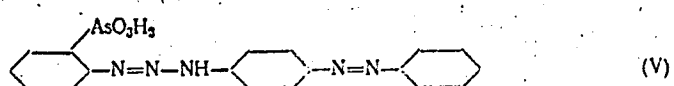
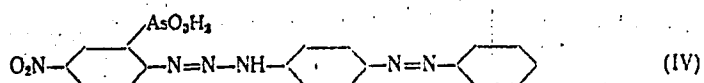
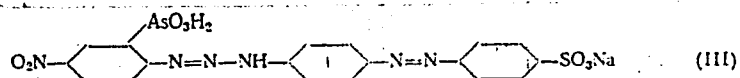
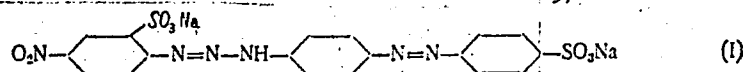
Соеди- нение	Чувствительность в $\gamma$ Pb в 5 мл	Максимум поглощения в $\mu\text{м}$ макс- твоем		Сдвиг максимума в $\mu\text{м}$
		в от- сутст- вие Pb	в при- сутст- вии Pb	
1	2	3	4	5
III	0,5	420	500	80
IV	1	420	480	60
V	5	410	430	20
VI	1	410	430	20

Legend to the table: Characteristics of  $2 \cdot 10^{-5}$  M solutions of arsenic-containing compounds in a 0.05M  $\text{Na}_2\text{B}_4\text{O}_7$  solution (pH~9)

1) Compound, 2) Sensitivity  $\gamma\text{Pb}/5\text{ml}$ ,  
3) Absorption maximum of the solutions  $\mu\text{m}$ ,  
3a) in the absence of Pb, 3b) in the  
presence of Pb, 4) Shift of the maximum  
 $\mu\text{m}$

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S/075/60/015/003/014/033/XX  
B005/B066



Card 5/5

3077

S/079/60/030/05/41/074  
B005/B016

53630

AUTHORS: Lukin, A. M., Kalinina, I. D.

TITLE: Investigations in the Field of Aryl Phosphonic Acids.<sup>1</sup>  
II. Synthesis of o-Hydroxy-benzene Phosphonic Acid and  
Some of Its Derivatives

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 5, pp. 1597-1601

TEXT: The authors begin the present paper with a survey of the methods described in publications which are applied to synthesize o-hydroxy-benzene phosphonic acid (Refs. 2-10). So far, this compound could, however, not be synthesized. The authors made an attempt to obtain this acid from o-aminophenol (according to Ref. 10), and from o-bromo-benzene phosphonic acid. The procedure described in Ref. 10 was somewhat modified to keep the formation of diaryl phosphonic acids as low as possible. 2-Amino-4-chloro phenol was first used as initial product. From this compound, 2-hydroxy-5-chloro-benzene phosphonic acid could be obtained in the form of an equimolecular mixture with its monopotassium salt without considerable difficulties. All attempts to prepare the desired o-hydroxy-

X

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Investigations in the Field of Aryl Phosphonic  
Acids. II. Synthesis of o-Hydroxy-benzene  
Phosphonic Acid and Some of Its Derivatives

S/079/60/030/05/41/074  
B005/B016

benzene phosphonic acid from this acid according to Ref. 10 were, however, unsuccessful since the C-P bond is unstable, and considerable resinification occurred. In further experiments, 2-amino-4-chloro phenol was diazotized in the presence of fluoboric acid. The resultant diazonium fluoborate was allowed to react with phosphorus trichloride in anhydrous ethyl acetate. After completion of this reaction, the resultant precipitate was filtered. The filtrate (A) was decomposed with water, and then allowed to react with the diazonium fluoborate of p-nitro-aniline in bicarbonate-alkaline medium. An azo dye containing phosphorus was formed the phenol component of which could be identified with the desired acid. By another treatment of filtrate (A) which is described, the barium salt of o-hydroxy-benzene phosphonic acid could be obtained in 16% yield. From this barium salt, an azo dye was prepared by coupling with the diazonium chloride of p-nitro-aniline which proved to be identical with the above-mentioned azo dye. Far better results were obtained in the synthesis of the o-hydroxy-benzene phosphonic acid from o-bromo-benzene phosphonic acid (Refs. 5,12). This acid could be converted by catalytic hydrolysis in alkaline or ammoniacal medium to give o-hydroxy-benzene phosphonic acid. Cuprous oxide

Card 2/3

Investigations in the Field of Aryl Phosphonic  
Acids. II. Synthesis of o-Hydroxy-benzene  
Phosphonic Acid and Some of Its Derivatives

S/079/60/030/05/41/074  
B005/B016

was used as a catalyst. In alkaline medium, the acid could not be obtained in pure condition while in ammoniacal medium chemically pure o-hydroxy-benzene phosphonic acid was obtained in a yield of 40%. The resultant acid in pure condition is a very stable white crystalline compound with a distinct melting point at 178-179°. Contrary to its 5-chloro derivative it couples readily with active diazo compounds. All reactions performed are described in detail in the experimental part. G. B. Zavarikhina and G. P. Stepanova assisted in the experimental work. There are 12 references, 2 of which are Soviet. X

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov (All-Union Scientific Research Institute of Chemical Reagents)

SUBMITTED: February 2, 1959

Card 3/3

S/079/60/030/012/022/027  
B001/B064

AUTHORS: Lukin, A. M., Kalinina, I. D., and Zavarikhina, G. B.

TITLE: On the Synthesis of o-Aminobenzene Phosphonic Acid and Its Derivatives

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 12, pp. 4072-4076


TEXT: The only method of synthesizing o-aminobenzene phosphonic acid ( $\text{o-NH}_2\text{C}_6\text{H}_4\text{PO}_3\text{H}_2$ ) which has hitherto been published was repeated by the authors in several experiments, however, it could not be confirmed. The method consists in substituting bromine in the o-bromobenzene phosphonic acid by the amino group (Ref.2). The reaction proceeds in two directions: 1) under formation of o-hydroxybenzene phosphonic acid and 2) under instantaneous hydrolysis of the C-P bond of the product to be expected (Refs.3-5). On the basis of the experimental results of Refs.6-9 the authors first attempted to synthesize o-aminobenzene phosphonic acid according to the method by G. O. Doak, L. D. Freedman (Ref.10) from o-nitroaniline. In this experiment, however, no further nitroproduct could be obtained besides o-nitrophenol, whereas in the mother liquor a

Card 1/3

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On the Synthesis of o-Aminobenzene Phosphonic Acid and Its Derivatives S/079/60/030/012/022/027  
B001/B064

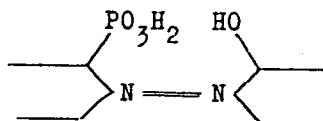
compound which could be diazotated was obtained. The corresponding amine could be isolated in the form of an azo dye which is a mixture of two azo dyes: the coupling product of chloro aniline and the amine containing the chlorine and the phosphone group. Further experiments showed that the latter amine is the 2-amino-5-chlorobenzene phosphonic acid (I). The authors assumed that the presence of a phosphone group in ortho position to the amino group increases the complex-forming capability of amine (I) as compared with chloro aniline. For this reason, they studied a method allowing the isolation of amine (I) directly as complexes with heavy metals. This experiment succeeded with the copper complex from which the acid was isolated in chemically pure state. In this case the necessary amount of CuCl (Ref.10) had to be increased by 3.5 times. Thus, the isolation of amine (I) was possible with an optimum yield of 15% (5% as azo dye). Besides chloro aniline, amine(I), and o-nitrophenol a series of side products was identified. This reaction is very complex. From the acid obtained 6 azo dyes were synthesized containing the ring-forming structure



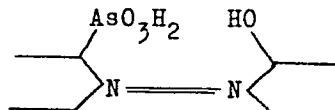
Card 2/3

On the Synthesis of o-Aminobenzene  
Phosphonic Acid and Its Derivatives

S/079/60/030/012/022/027  
B001/B064



which is similar to the well known structure



(Refs.11-19). The analytical properties of the azo compounds obtained will be further studied. G. P. Stepanova took part in the experimental work. There are 22 references: 12 Soviet, 9 US, and 1 British.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut  
khimicheskikh reaktivov (All-Union Scientific Research  
Institute of Chemical Reagents)

SUBMITTED: January 3, 1960

Card 3/3

NEMODRUK, A.A.; NOVIKOV, Yu.P.; LUKIN, A.M.; KALININA, I.D.

2,7-Bis-(4-chloro-2-phosphonbenzeneazo)-1,8-dihydroxynaphthalene-3,6-disulfonic acid (chlorophosphonazo III), a new reagent for the photometric determination of uranium. Zhur.anal.khim. 16 no.2:180-184 Mr-Apr '61. (MIRA 14:5)

1. Vernadskiy Institute of Geochemistry and Analytical Chemistry, Academy of Sciences U.S.S.R., Moscow.  
(Uranium--Analysis)

NEMODRUK, A.A.; NOVIKOV, Yu.P.; LUKIN, A.M.; KALININA, I.D.

2-(4-Chloro-2-phosphonobenzeneazo)-1,8-dihydroxynaphthalene-3,6-disulfonic acid (chlorophosphonazo 1) as a reagent for the photometric determination of hexavalent uranium. Zhur. anal.khim. 16 no.3:292-296 My-Je '61. (MIRA 14:6)

1. V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences U.S.S.R., and All-Union Scientific Research Institute of Chemical Reagents, Moscow.  
(Uranium—Analysis)

LUKIN, A.M.; KALININA, I.F.

New reagents synthesized by the Institute of Chemical Reagents.  
Zav.lab. 27 no.2:239-240 '61. (MIRA 14:3)  
(Chemical tests and reagents)



LUKIN, A.M.; PETROVA, G.S.

Interaction between sulfarsazene and lead. Zhur. ob. khim. 31  
no.4:1254-1259 Ap '61. (MIRA 14:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh  
reaktivov.

(Lead organic compounds)  
(Arsenic organic compounds)

LUKIN, A.M.; KALININA, I.D.

Interaction between nitrobenzenediazonium fluoborates and phosphorus trichloride. Dokl. AN SSSR 137 no.4:873-875 Ap '61.

(MIR: 13:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh reaktivov. Predstavleno akademikom M. I. Kabachnikom.

(Diazonium compounds)  
(Boron fluoride)

LUKIN, A.M.; VAYNSHTEYN, Yu.T.; DYATLOVA, N.M.; PETROVA, G.S.

Interaction of sulfarazen with lead ions. Zhur.anal.khim. 17  
no.2:212-217 Mr-Apr '62. (MIRA 15:4)  
(Lead--Analysis)

LUKIN, A.M.; PETROVA, G.S.

Arsazene. Met. poluch. khim. reak. i prepar. no.6:  
14-16 '62.

Sulfarsazene. Ibid.:16-18

Cadion prepared by the Institute of Chemical Reagents.  
Ibid.:18-20 (MIRA 17:5)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut  
khimicheskikh reaktivov i osobo chistykh khimicheskikh  
veshchestv.

LUKIN, A.M.; CHERNAYA, L.S.; PETROVA, G.S.; SOSNINA, A.I.

Extraction determination of lead by means of arsenic.

Zav.lab. 28 no.4:398-401 '62.

(MIRA 15:5)

(Lead-Analysis)

LUKIN, A.M.; SMIRNOVA, K.A.; ZAVARIKHINA, G.B.

New reagent for the photometric and complexonometric  
determination of calcium. Zhur.anal.khim. 18 no.4:444-449 Ap '63.  
(MIRA 16:6)

1. All-Union Scientific-Research Institute of Chemical Reagents  
and Chemical Substances of Special Purity, Moscow.  
(Calcium--Analysis) (Complexons) (Photometry)

L 10620-63

ACCESSION NR: AP3001017

S/0075/63/018/005/0562/0566

44

AUTHOR: Luk'yanov, V. F.; Lukin, A. M.; Knyazeva, Ye. M.; Kalinina, I. D.

TITLE: 4-chlorobenzene-2-phosphonic acid-(1-azo-1)-2-hydroxynaphthalene-3, 6-disulphonic acid (chlorphosphonazo R) as a reagent for photometric determination of beryllium

SOURCE: Zhurnal analiticheskoy khimii, v. 18, no. 5, 1963, 562-566

TOPIC TAGS: determination of beryllium; chlorphosphonazo R; photometry

ABSTRACT: Chlorphosphonazo R (4-chlorobenzene-2-phosphonic acid-(1-azo-1)-2-hydroxynaphthalene-3, 6-disulphonic acid) has been proposed for the photometric determination of beryllium. The reagent forms a stable yellow compound with beryllium which permits the determination of beryllium in the presence of masking substances without prior separation of beryllium. The concentrations of beryllium as low as 0.1% can be determined in the presence of 10% of iron. The sensitivity of the determination is 0.1 ppm of BeO. The relative experimental error is not more than + or - 5% when the BeO content is 0.05 to 0.50%. The relative error increase to + or - 10% when the BeO content is less than 0.05%. Although the above reagent is not selective for beryllium, K sup +, Na sup +, Ti sup +, Tl sup 3+, Sn sup

Card 1/2

L 10620-63

ACCESSION NR: AP3001017

2+, Sn sup VI, Sb sup III, Cr sup 3+, Bi sup 3+, Ta sup V, Nb sup V ions do not form color complexes. Orig. art. has: 3 tables and 2 graphs.

ASSOCIATION: none

SUBMITTED: 25Jul61

DATE ACQD: 12Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 012

OTHER: 000

ch/ed  
Card 2/2



SEREBRYAKOVA, G.V.; LUKIN, A.M.; BOZHEVOL'NOV, Ye.A.

Luminescent properties of azo compounds based on barbituric acid.  
New reagent for magnesium. Zhur.anal. khim. 18 no.6:706-711 Jg '63.  
(MIRA 16:9)

1. All-Union Scientific-Research Institute of Chemical Reagents and  
Chemical Substances of Special Purity, Moscow.  
(Azo compounds) (Barbituric acid) (Magnesium--Analysis)

LUKIN, A.M.; ZELENICHKO, M.I.; CHERNYSHEVA, T.V.

Chlorophosphonate III, a new reagent for strontium. Zhur. anal.  
khim. 19 no.12:1513-1515 '64 (MIRA 18:1)

1. All-Union Scientific-Research Institute of Chemical Reagents  
and Specially Pure Chemicals, Moscow.

LUKIN, A.M.

Role of ixodid ticks in the epizootiology of foot-and -  
mouth disease. Veterinariia 40 no.11:28-30 N '63. (MIRA 17:9)

1. Novosibirskaya nauchno-issledovatel'skaya veterinarnaya  
stantsiya.

SEREBRYAKOVA, G.V.; BOZHEVOL'NOV, Ye.A.; GODLINA, G.S.; LUKIN, A.M.

Bis-salicylal ethylenediamine, a luminescent reagent for the  
determination of magnesium. Trudy IREA no.25:9-16 '63.  
(MIRA 18:6)

LUKIN, A.M.

Factors of interaction of organic reagents with inorganic ions  
and "analytical-active groups." Trudy IREA no.25:149-160 '63.  
(MIRA 18:6)

LUKIN, A.M.; PETROVA, G.S.; DYATLOVA, N.M.

Reaction of cadion (prepared by the Institute of Chemical Reagents)  
with lead and cadmium. Trudy IREA no. 161-171 '63.

(MIRA 18:6)

LUKIN, A.M.

Preservation and transmission of the foot-and-mouth disease virus  
by ixodid ticks. Trudy Inst. zool. AN Kazakh. SSR 22:44-48 '64.  
(MIRA 17:12)

LUKIN, A.N.

137-58-5-8793

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 9 (USSR)

AUTHOR: Lukin, A. N.

TITLE: Work Performed at the Belovo Zinc Plant in Order to Intensify the Roasting of Zinc Concentrates (Opyt raboty Belovskogo tsinkovogo zavoda po intensifikatsii obzhiga tsinkovykh kontsentratsiy)

PERIODICAL: Tr. soveshchaniya po metallurgii tsinka, 1954, Moscow, Metallurgizdat, 1956, pp 70-79

ABSTRACT: The two-stage method currently employed at the plant for roasting of Zn concentrates (in 7-hearth furnaces and in a sintering machine) does not produce a satisfactory sinter, because after roasting in a 7-hearth furnace the cinder contains excessive amounts of S (up to 12 percent), Pb, and Cd. Investigation revealed that the S content in the cinder may be cut in half (6 percent) if, after the shaft and the raking assemblies have cooled off, hot air is blown through the layer of the concentrate being roasted on the hearth. The furnace was re-designed so as to permit blowing of hotter air into the lower hearths (the sixth and the seventh). Cold air is supplied for cooling of the raking assemblies in the

Card 1/2



137-58-5-8793

Work Performed at the Belovo Zinc Plant (cont.)

five upper levels. A portion of air which has been heated at this stage to a temperature of 150<sup>o</sup>-200<sup>o</sup>C enters a thermally insulated collector unit, whence it proceeds to the sixth and seventh hearths; there it cools the raking assemblies and, being heated thereby, is blown through the material being roasted via special pipes mounted on the rakes. For the purposes of blowing hot air through the layer of concentrate, the fourth and the fifth hearths are equipped with two additional raking bars carrying special heat-resistant tubes instead of rakes; immersed into the layer of concentrate to a depth of 3-4 cm, these tubes serve as passageways for the air that has been heated in the upper hearths. A diagram of the air flow and of the raking bars is shown. Blowing hot air through the layers of concentrate expanded the high-temperature region (900<sup>o</sup>-1000<sup>o</sup>) without using any additional fuel and reduced the content of Pb, Cd, and S in the cinder by 39 percent, 27 percent, and 50 percent, respectively.

1. Zinc ores--Processing    2. Furnaces--Operation

A. P.

Card 2/2

SOV/136-59-6-5/24

AUTHORS: Babina, I.V., Besser, A.D., Alyushin, Ye.I.,  
Lukin, A.N. and Yedziyev, S.S.

TITLE: Roasting of Zinc Concentrates in an Effervescent Bed  
with Simultaneous Elimination of Lead and Cadmium and  
Coarsening of Cinder Granules (Obzhig tsinkovykh  
kontsentrato v kipyashchem sloye s otgonkoy svintsa i  
kadmiya i ukрупneniyem zeren ogarka)

PERIODICAL: Tsvetnyye metally, 1959, Nr 6, pp 27-32 (USSR)

ABSTRACT: By carrying out roasting of zinc concentrates in an  
effervescent bed with simultaneous granulation of the  
cinders and volatilisation of lead and cadmium, it was  
found that when the speed of air supply to the furnace  
was increased to 17-20 cm/sec, roasting could be carried  
out at a bed temperature of 1100 - 1150°C. An  
examination of the laboratory results was carried out in  
the reconstructed furnace KS-3. When the furnace was  
reconstructed for the first time, the hearth area was  
decreased from 19.3 to 8.4 m<sup>2</sup> and it was given a  
rectangular shape with a length-to-width ratio of 5.3:1.  
This made it possible for the mildly oxidizing zone in the

Card 1/6

SOV/136-59-6-5/24

Roasting of Zinc Concentrates in an Effervescent Bed with  
Simultaneous Elimination of Lead and Cadmium and Coarsening of  
Cinder Granules

effervescent bed to be extended and thereby favourable conditions to be created for the elimination of lead and cadmium as sulphides (the vapour tension of these metals at the roasting temperature is higher than that of oxides). The decrease of the hearth area was brought about by an extra layer of fireclay brick; vertical brick walls were laid up to a height of 1.2 m and above that followed a slanting layer at an angle of 60° (Figure 1). In the reconstruction of the furnace KS-3, a means for the separation of coarse dust from volatile matter at 750 - 800°C was provided in the form of dust extractors. Experiments carried out in the thus altered furnace have confirmed the laboratory experiments and shown that at 1050 - 1150°C the roasting process goes on steadily, the material is not turned into monolite but a coarsening of the cinder granules and a decrease in dust loss is observed. The work of the lined dust extractors was, however, rendered difficult because of

Card 2/6

SOV/136-59-6-5/24

Roasting of Zinc Concentrates in an Effervescent Bed with  
Simultaneous Elimination of Lead and Cadmium and Coarsening of  
Cinder Granules

formation of crust of sulphided dust inside them. However, in the second reconstruction of the furnace, it was decided to see whether it was possible to catch the coarse dust in dust chambers built inside the furnace. To this end, vertical divisions were made of brick inside the furnace. A diagram of the layout of chambers in the furnace is shown in Figure 2. Investigations carried out after the second reconstruction of the furnace have shown that 80% of the dust was caught in the chambers. As a result of the unfavourable position of the gas inlet into the first chambers, the dust loss increased in this series of experiments up to 50% of the total quantity of solid roasting products. The third reconstruction of the furnace (Figure 3) was designed to reduce dust losses by increasing the volume of the furnace above the bed. The hearth area was decreased to 6.6 m<sup>2</sup> and the dust chambers inside the furnace were left out. The slanting part of the furnace was made at an angle of 75 - 80° to the horizontal. The control layout for the

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technological parameters of the roasting process is shown in Figure 4. A mixture consisting of zinc concentrates with an addition of Waelz oxides was roasted. The charge contained 46-48% Zn, 27-29% S, 1.1-1.4% Pb, 0.14-0.19% Cd and 10-11% moisture. This was charged into the fore-chamber of the furnace. The cinders were cooled and submitted to further treatment. Investigations were carried out at 950, 1000, 1050, 1150 and 1190°C. At a temperature of above 1000°C, the elimination of Pb and Cd from the cinders proceeded satisfactorily and the amount which was removed increased with increasing temperature of the bed. This dependence is shown in Table 2 and in Figure 5. The reduction of dust removal in relation to the temperature of the process is shown in Figure 6. As a result of their investigations, the authors have arrived at the following conclusions:

1) The method worked out for roasting zinc concentrates  
Card 4/6 enables the output of the effervescent-bed furnace to be

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sharply increased and enables cinders to be obtained which are suitable for pyrometallurgical re-treatment in which the sintering stage is left out. The new method also enables the extraction of Pb and Cd to be sharply raised by re-treating sublimates which are enriched with these metals.

2) At a temperature of 1100 - 1190°C, the furnace works steadily; the hearth remains free of crusts.

3) In order to cut down the dust losses to a minimum, the furnace must have a considerable volume above the bed which ensures a long stay and a low speed of the gas in the working space of the furnace. The charge must be added directly to the effervescent bed.

4) In order to attain the best elimination of Pb and Cd the furnace must have a rectangular shape with a length-to-width ratio of the hearth of approximately 6:1.

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There are 6 figures and 2 tables.

ASSOCIATIONS: Gintsvetmet (Babina, I. V., Besser, A. D.)  
Belovskiy tsinkovyy zavod (Belovo Zinc Plant) (Alyushin, Ye.I.,  
Lukin, A.N., Yevsdiyev, S.S.)

Card 6/6

LUKIN, A. P.

29840

Vvlapshchiesya russkiy mostoviki xix stolyetiya. (D. I. Zhuravskiy, S. V. kyerbyedz i N. A. Byelyyubskiy). Trudy Akad. (Voyen,- Transp. akad. vooruzh. sil im kaganov-icha), vyp. 17, 1949, s. 3-21

SO: L E T O P I S ' NO.40



LUXIN, A.V., kand.tekhn.nauk, dotsent; VOL'PE, L., red.

[Technology of machinery manufacture; automobile and tractor manufacture; manufacture, assembly, and installations of turbines; manufacture of electrical machinery and apparatus. Technology of machinery manufacture and repair of equipment in the chemical industries; instructions and problems] Tekhnologiya mashinostroeniya, avtotraktorostroeniya, proizvodstva, sborki i montazha turbin, proizvodstva elektricheskikh mashin i apparatov. Tekhnologiya mashinostroeniya i remont oborudovaniya v khimicheskoi promyshlennosti; metodicheskie ukazaniya i kontrol'nye zadaniya. Fakul'tety: mekhaniko-tekhnologicheskii, mashinostroitel'nyi, elektroenergeticheskii i teploenergeticheskii. Leningrad, 1958. 38 p.

(MIRA 12:1)

1. Severo-zapadnyy zaachnyy politekhnicheskiiy institut. Kafedra tekhnologii mashinostroyeniya.

(Industrial equipment) (Machinery)

ABKHAZI, V.I.; ANTONOV, V.Ya.; BLYUMENBERG, V.V.; VARENTSOV, V.S.;  
VELLER, M.A.; ZYUZIN, V.A.; IVANOV, V.N.; KUZHMAN, G.I.;  
LUKIN, A.V.; MATVEYEV, A.M.; CZEROV, B.M.; PAL'TSEV, A.G.;  
PEROV, N.P.; PROKHOROV, N.I.; RAKOVSKIY, V.Ye.; SEMENSKIY, Ye.P.;  
SOLOPOV, S.G.; TYUREMNOV, S.N.; TSUPROV, S.A.; CHULYUKOV, M.A.

Viktor Georgievich Goriachkin; obituary. Torf.prom. 39 no.4:40  
'62. (MIRA 15:7)

(Goriachkin, Viktor Georgievich, 1893-1962)

L 26613-65 EMG(j)/EWA(k)/FBD/ENT(1)/EEC(k)-2/EEG(t)/T/EEC(b)-2/EMP(k)/EWA(h)/EWA(m)-2  
Pn-l/Po-l/Pf-l/Feb/Pl-l/F1-l IJP(c) W3

ACCESSION NR: AP5005060

S/0051/65/018/002/0353/0354

AUTHOR: Yermakov, B. A.; Lukin, A. V.; Mak, A. A.

TITLE: Reducing metastable level lifetime in a modulated-Q laser

SOURCE: Optika i spektroskopiya, v. 18, no. 2, 1965, 353-354

TOPIC TAGS: laser, metastable level lifetime, metastable level population,  
Q modulator, Q spoiler

ABSTRACT: Stored excitation energy is limited by the decrease in effective metastable level lifetime when Q modulation tends to enhance spontaneous emission. The problem was examined in a four-level system in which the population  $N_M$  of the metastable level was considerably smaller than the population of the ground state. The dependence of the effective excited state lifetime ( $\tau_{eff}$ ) on the number of stimulated transitions and on the population  $N_M$  of the metastable level was determined. In the first approximation  $\tau_{eff}$  can be regarded as equal to the time constant of the emission decay after the end of the pumping pulse; it was found to be 2.8 msec, considerably smaller than the lifetime  $\tau = 20$  msec determined from scintillation decay. The results obtained show that the lifetime of the metastable level can decrease considerably when the operation is conducted at a single pulse regime. Orig. art. has: 1 figure and 2 formulas. [JA]

Card 1/2

L 26613-65

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ACCESSION NR: AP5005060

ASSOCIATION: none

SUBMITTED: 19Jun64

ENCL: 00

SUB CODE: Ec, NP

NO REF SOV: 000

OTHER: 001

ATD PRESS: 3188

Card 2/2

COMMON ELEMENTS										1ST AND 2ND CATEGORIES										3RD AND 4TH CATEGORIES									
MATERIALS INDEX										PROCESSES AND PROPERTIES INDEX																			
A																				B									
<p>3555. RELATIONS BETWEEN MOISTURE CONTENT AND INTENSITY OF DRYING OF PEAT. Lukin, A. V. (Torfyanaya Promyshlennost (Peat Industry), 1947, (12), 17-19). (L).</p>																													
ASH-114 METALLURGICAL LITERATURE CLASSIFICATION																													
GROUPS										SUBGROUPS										SUBSUBGROUPS									
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z										1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20										1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20									

4310. DRYING OF CUT PEAT OF DIFFERENT COMPOSITION. Goryatchkin,  
V. G. and Lukin, A. (Torfyanaya Promyshlennost (Peat Industry).  
May 1947, 24, No.4, 21-22; Chem. Zbl. 1947, 1, 768).

\*The most favourable size for tests with cut peat is 15-25 mm.

LUKIN, A. V.

166T39

USSR/Hydrology - Peat Bogs

Sep/Oct 48

"Water Regime of the Upper Layer of Drained Peat Bogs," A. V. Lukin

"Meteorol i Gidrol" No 5, pp 56-62

As result of observations over many years at Cen Exptl Peat Sta of the NKZ, RSFSR and the Moscow Peat Inst, basic principles governing changes of water regime of upper layer of peat bogs determined. This water regime is of very great practical importance in working peat deposit for fuel, especially by shredding method. Submitted. 20 Jan 48.

166T39

GORYACHKIN, V.G., professor; LUKIN, A.V., kandidat tekhnicheskikh nauk.

Variations in volume weight of peat according to the depth of drainage of  
the deposits. Torf.prom. 30 no.7:26-27 J1 '53. (MLSA 6:7)

(Peat)

1. Moskovskiy toryanoy institut.



15-57-3-4033

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 3,  
p 212 (USSR)

AUTHOR: Lukin, A. V.

TITLE: A Method for Approximate Calculation of the Drying of  
Cut Peat (Metod priblizhennogo rascheta sushki frezer-  
nogo torfa)

PERIODICAL: Tr. Mosk. torf. in-ta, 1955, Nr 3, pp 25-32

ABSTRACT: Bibliographic entry

Card 1/1

LUKIN, A.V., kandidat tekhnicheskikh nauk.

Determination of peat brick sizes accounting for uniform shrinkage. Torf. prom. 32 no.1:19-20 '55. (MIRA 8:3)

1. Moskovskiy torfyanoy institut.  
(Peat industry)

L 25511-66 EWT(1)/EWT(m) IJP(c) AT/JD

ACC NR: AP6011401

SOURCE CODE: UR/0057/66/036/003/0526/0532

AUTHOR: Afanas'yeva, V.L.; Lukin, A.V.; Kustafin, K.S.

ORG: none

TITLE: Determination of electron energy distribution functions in hollow cathode discharges in helium-neon mixtures

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 3, 1966, 526-532

TOPIC TAGS: gas discharge plasma, excited state, helium, neon, plasma electron temperature, metastable state, particle collision, electron density, energy distribution, cold cathode tube

ABSTRACT: Electron concentrations and energy distributions were measured and excited state populations were calculated in 100-200 mA hollow cathode discharges in helium-neon mixtures. The neon partial pressure was 0.1 mm Hg in all the measurements; the helium partial pressure was varied from 0.3 to 7 mm Hg. The discharges took place in a 30 cm long 1.2 cm diameter water-cooled kovar tube which served as cathode. The two anodes were mounted in branch tubes. The electron density and distribution measurements were made with three 6 mm long 0.06 mm diameter molybdenum probes, which could be retracted into side tubes to prevent their destruction during preliminary cleansing discharges. The distribution functions were calculated from the probe characteristics with the formula of M. Druyvestein (Zh. f. Phys., 64, 781, 790, 1963).

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UDC: 537.525

L 25511-66

ACC NR: AP6011401

The second derivative of the probe characteristic required for this calculation was obtained by modulating the probe potential at 1 MHz and measuring the 2 MHz component of the probe current. This technique and the electronic equipment with which the measurements were performed was tested by measuring electron distributions in mercury positive columns; the results of these measurements were in satisfactory agreement with corresponding data in the literature. The distribution curves obtained for the hollow cathode helium-neon discharges were rather close to Maxwellian. No high energy maxima were found, although there was a pronounced bulge at about 17 eV on the distribution curve for the discharge in which the helium pressure was 0.3 mm Hg. The observed electron temperatures and concentrations ranged between  $19.5 \times 10^3$  and  $68.5 \times 10^3$  °K and between  $3.3 \times 10^{10}$  and  $11 \times 10^{10}$  cm<sup>-3</sup>. The electron temperatures and concentrations were higher near the anodes than midway between them. The measured electron densities and distribution functions were employed to calculate the populations of the metastable  $2^3S_1$  helium level and the  $1s$ ,  $2p_4$ , and  $2s_2$  neon levels (Paschen's notation). Cascade and stepwise excitation processes and electron collisions of the second kind were neglected in these calculations, but collisions of the second kind between helium and neon atoms and collisions with the wall were taken into account in calculating the lifetime of the  $2^3S_1$  helium level. The data of V.P. Bennet (UFN, 81, 119, 1963) were employed for the lifetimes of the  $2p_4$  and  $2s_2$  neon levels. There was population inversion between the  $2s_2$  and  $2p_4$  levels. At a helium pressure of 0.3 mm Hg, electron collisions and collisions of the second kind contributed approximately equally to the population of the  $2s_2$  neon level; at helium pressures above 3 mm Hg

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